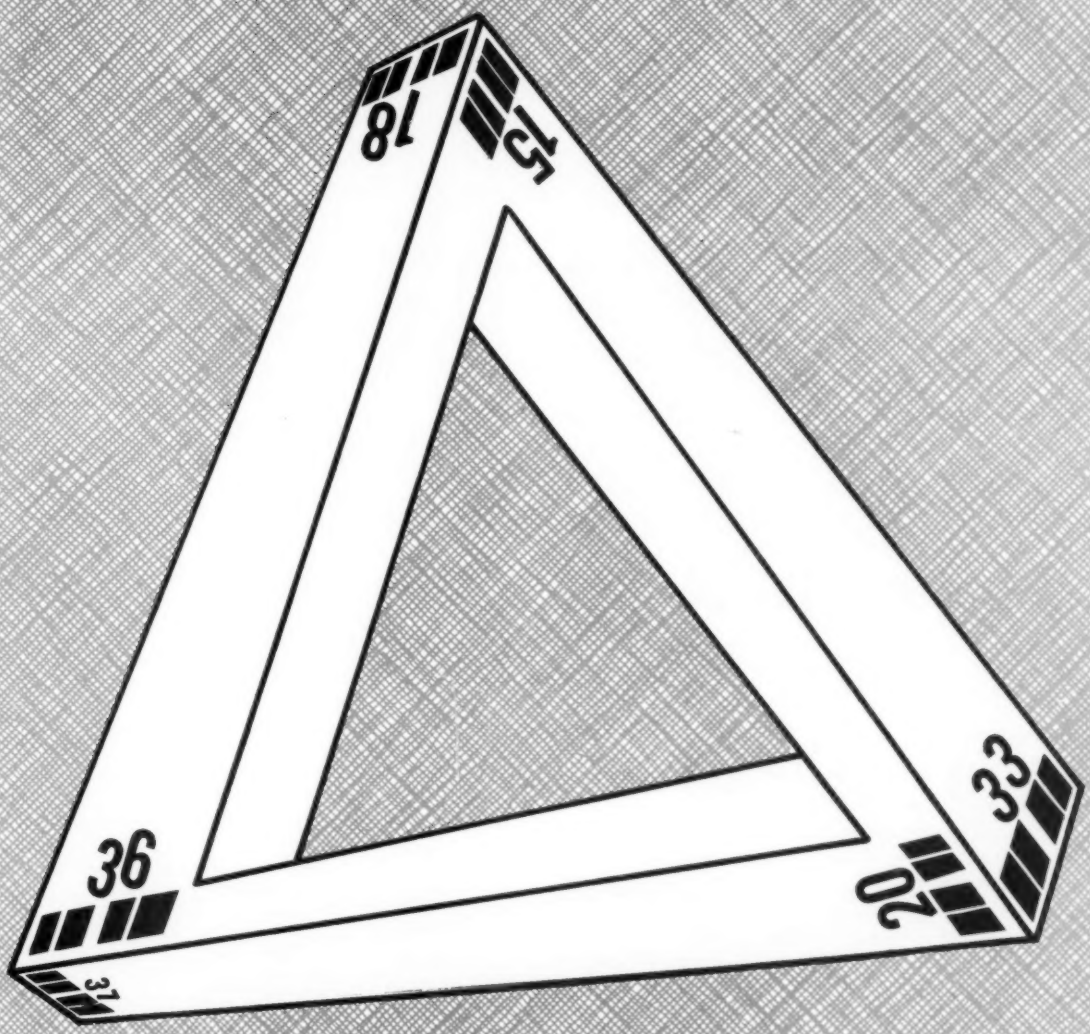
The MAC Flyer

JUNE 1981



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The MAC Flyer

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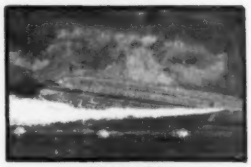

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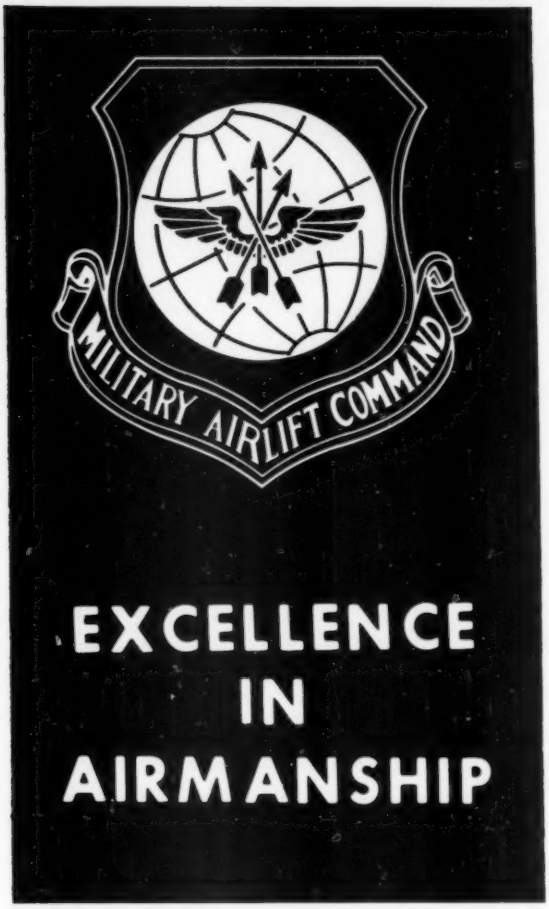


Captain Harris and crew. Following a night, shortfield training mission at an Army airfield in Germany, Capt Ernest L. Harris, Jr, instructor pilot, and his 37 TAS C-130 crew were returning to Rhein Main AB. Descending through FL 120, the number two engine oil quantity suddenly dropped from ten to four gallons and the low oil quantity warning light came on. The loadmaster, MSgt Edward Acosta, scanned the engine and reported a heavy stream of oil flowing from the drain mast. At Harris' direction, Captain Samuel K. Byers, the copilot, feathered number two and coordinated a level off at FL 120. Just as Byers and instructor flight engineer, SSgt. William B. Spiece, were wrapping up the engine shutdown checklist, Sergeant Acosta reported that the troublesome turboprop was now trailing a 20-foot blowtorch of flames. The crew discharged number one firebottle, isolated the left wing's bleed air and the navigator, 1Lt Roger L. VanZee, pinpointed Nurnburg airport as the closest suitable recovery base. Two highspeed descents and a second firebottle failed to quench the flaming engine, but it finally stopped buring by itself during leveloff at 4,000 feet. Then, as Captain Harris slowed to begin setting up for landing, the fire reignited and continued to burn out of control throughout the rest of the approach and touchdown, which were accomplished safely despite poor visibility and gusty crosswinds. Only the close professional coordination of the entire crew and exceptional airmanship saved them and their burning Hercules from a disastrous mishap.

Left to right: MSgt Edward Acosta, LM; SSgt William B. Spiece, FE; Capt Ernest L. Harris, Jr., AC; Capt Samuel K. Byers, CP; 1LT Roger L. VanZee, N.

Lieutenant Colonels Hodge and Weaver. Three-quarters of a mile from the runway on a missed approach from an ILS, Lt Col Thomas E. Hodge, 75 MAS chief pilot, and Lt Col Floyd W. Weaver, 22 AF Standardization/Evaluation, heard and felt a loud thump in their C-5. The pilots leveled off the Galaxy to assess the situation and discovered number three engine fuel flow had dropped to zero and the oil pressure low light on number one was illuminated. In addition, a significant vibration could be felt throughout the aircraft. Taking stock of the fact that landing on Travis' primary runway was not possible at that point, the pilots maneuvered to the adjacent runway and set up for

landing there rather than attempt a go-around. Touchdown was accomplished, and almost immediately after clearing the active, the crew shut down everything and evacuated their wounded giant due to an unusual odor which was permeating it. Maintenance checks revealed approximately 60 large birdstrikes which had damaged the number one, three and four engines, the radome and the leading edge slats! Damage to the engines was severe. An attempted go-around may not have been successful. The flawless judgment and airmanship of Lieutenant Colonels Hodge and Weaver prevented a potentially serious mishap and saved the day for themselves and their crew.

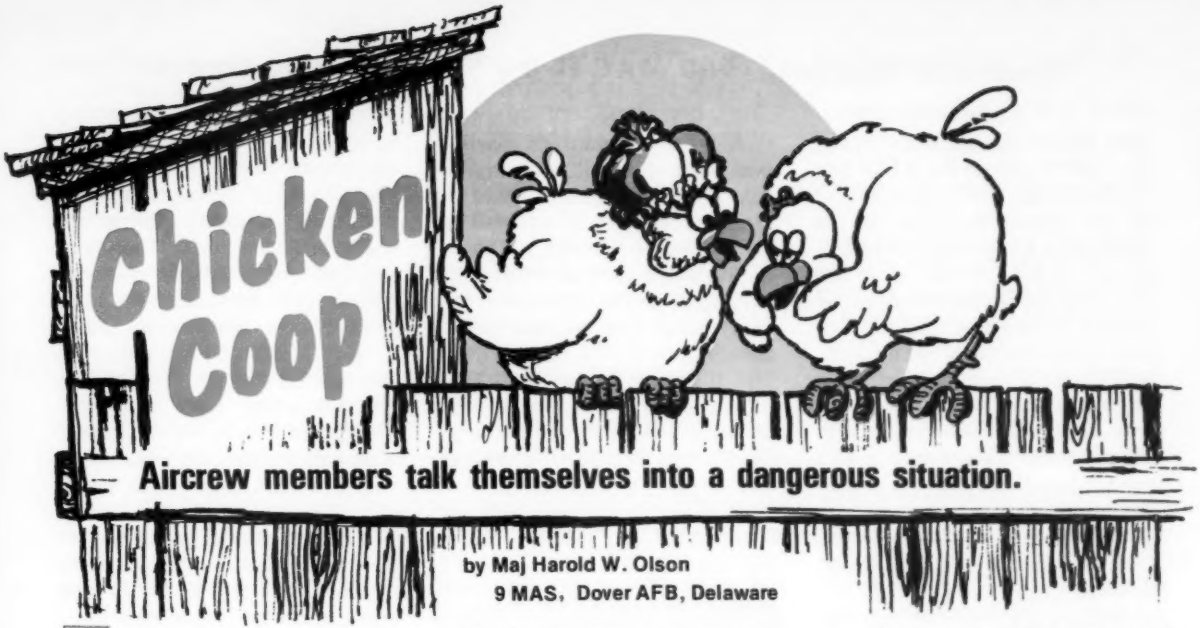
Lt Col Floyd W. Weaver and Lt Col Thomas E. Hodge.

Major Hancock and crew. During a C-130 personnel airdrop mission, while the Army troops were deploying, the second jumper in a stick of nine got fouled in the static lines as he exited the aircraft. SSgt David R. McGinley, the instructor loadmaster, had coordinated his actions with the rest of the crew and was about to cut the lines and free the dangling trooper when he took one last look. He noticed that the chutist was now giving conflicting signals and appeared to be drifting in and out of consciousness. After another quick parley with the rest of the crew, McGinley and another loadmaster, Sgt John Gerhard, quickly retrieved the distressed jumper—who by this time was completely unconscious. Had McGinley not rechecked the hung paratrooper's condition, he would have released an unconscious man unable to deploy his reserve parachute manually. Major Larry D. Hancock, aircraft commander, and the entire 62 TAS crew were cited for their superb coordination and outstanding procedural knowledge in handling this rare and dangerous emergency.

Left to right: Maj Larry D. Hancock, IAC; Capt Jeffrey A. Northgraves, N; Sgt John Gerhard, LM; SSgt David R. McGinley, ILM; SSgt Jeffrey J. Kohr, FE, Maj Michael W. Riely, CP

Capt Donald G. Fair was near the end of a training mission in twilight VMC weather when he called for the gear to be lowered on his CT-39. Although the wheels appeared to be down during a tower flyby, the right main indicated unsafe and the red light in the gear handle remained illuminated. Additionally, no trim was available in the six-to-nine-degree range and the gear doors wouldn't close. With 1,300 pounds of fuel remaining, the emergency gear lowering checklist was completed. A Conference Skyhook was also initiated, but time ran out before it could be completely set up. With appropriate emergency briefings completed, Captain Fair set the Sabreliner down on the left gear, holding the right main off with flight controls as long as possible. Shortly after touchdown, however, the right main collapsed and the CT-39 skidded down the runway 200 to 300 feet. Captain Fair's superior airmanship limited aircraft damage to an absolute minimum.

Captain Donald G. Fair, IP



Aircrew members talk themselves into a dangerous situation.

by Maj Harold W. Olson
9 MAS, Dover AFB, Delaware

The rain was pouring down as Captain Sam Jones arrived at the squadron 45 minutes after his 0200 alert call. A warm front was pushing over the Delmarva Peninsula, bringing warm, moist Gulf air over the cool land mass below. The lights of the parking lot were circled with halos from the refraction of water droplets in the damp surrounding air. Jones slammed the car door and stepped over several puddles, wondering if the vintage Chevy would start two days from now when he returned from the mission. He was beginning to regret not taking it in for a tune-up even though he'd really been too busy.

Sam pushed through the double doors of the C-5 Squadron and blinked momentarily as his eyes adjusted to the brightness of the lights. Wiping the sleep from his eyes, he knew he wasn't still fully up to speed despite the fact that he'd crawled out of bed a full hour before. "Well, who the heck is really awake at three o'clock in the morning," he chided himself. At the ops counter other crewmembers were busy moving around checking their passports and FCIF cards, although it was noticeably quiet except for a few scattered yawns. He grinned at the crew and got a few smiles in return as they recognized their AC for the mission. Around the squadron Sam was known as a "Good Old Boy," one of those folks who always had a smile on his face and was easy going, with never a bad word to say about anyone. Crewmembers and support agencies alike occassionally took advantage of Sam's easy going nature, but he never complained nor lacked for volunteers for his crew. He was affectionately called "Smilin' Sam" by people who knew him well.

This morning Sam and his crew were scheduled for a routine channel mission from Dover to Frankfurt, where they would crew rest, followed by a return flight to Dover. Sam looked over the individual members of the group as he reviewed the flight orders. He recognized the copilot as a new guy in the squadron who had already picked up the reputation of being a non-stop talker. Captain Tony Bertoli was a bright-eyed bachelor whose dream of the ultimate PCS was to La Guardia Airport, close to the land of wine and pasta, with frequent side trips on a "Friendly Skies" 747. With his ATP completed, only a few hundred flying hours remained before he made his break to fulfill his dreams. Major Nick Smith, the navigator for the mission, said hello as Sam handed him the computer flight plan for the first leg. Nick was an investment fanatic, following the stocks and commodities markets avidly on a daily basis. He took pride in the careful way he handled the nav equipment and the fact that he had never picked up a violation. With a 24-mile tolerance on the long over-water tracks of the North Atlantic, navigators really earned their pay on these missions.

MSgt Pete Luzinski, Chief Flight Engineer, turned a deaf ear to the inevitable joke involving his ancestors and asked

Honorable Mention, 1980 MAC Flying Safety Writing Contest

Sam about the aircraft. "We've got 70777 parked on X-ray and it's listed as 'OR'," Sam smiled as he passed the data. In his spare time away from the engineer's panel, Pete enjoyed shooting out the middle of paper targets while serving as head of the local Rod and Gun Club. Pete's good buddy, TSgt Mike Flanagan, was also on this trip and would be serving as Chief Loadmaster. Sam handed him the load and pax sheets, as well as a dollar contribution toward the coffee fund. "Big Mike" was a star player for the squadron football team, renowned for his rampaging style in bowling over opposing blockers. This morning he sported a few bruises from the squadron's latest game. Mike's Irish wit and on-going flow of chatter had livened up many a previous trip. The other members of the crew included several additional loadmasters, engineers and a crew chief, bringing the total number of green baggers to 11.

Following Sam's briefing, they all headed for base operations where they arranged for crew transport to the aircraft. Sam, Tony and Nick remained behind to accomplish the flight planning. After filling out the paperwork and reviewing the route, they stopped by weather for their final briefing. The forecaster reported that Frankfurt would be clearing out following passage of a cold front that was moving down from the North Sea. No problems were anticipated and Ramstein was selected as the alternate, although it barely met the weather requirements. Sam filed the flight plan, and following a quick stop at the snack bar, the group headed out to the aircraft.

A small amount of daylight was starting to filter through the rain clouds as Sam climbed the Galaxy's crew entrance ladder. Luzinski was waiting at the top of the steps with word that the preflight was complete and everything was in the green. Sam nodded and headed back into the crew compartment for a look at the 781. The forms were in order and shortly thereafter they began the pre-start checklist. Start, taxi, and takeoff were normal and two hours later the Galaxy headed out over water as Gander Center said goodby to "MAC Seven Zero Triple Seven." After check-in with MacDill on HF, the radio fell silent and the crewmembers began to stir. The previously quiet interphone started to hum as first one, then another of the crew began to talk.

Around the squadron Sam was known as a "good old boy."

The conversation started innocently enough when Sam mentioned that his car had been giving him trouble and that he hoped it would start when they got back to the home 'drome. Tony B. was sympathetic and mentioned that he had just bought a new red, white and green Fiat Spider because of the problems that he'd had with his previous import. He also related how his new girl friend had drooled at first sight of the machine's clean lines. This was followed by a discussion of the new girl friend with emphasis on her many virtues. "I guess I'm really in love," Tony exclaimed.

"Look, Romeo," came the voice of Pistol Pete. "There's no way the looks of one of those cars or girls can match the lines of the new Remington Model 1100." Pete then began a discourse on the weapon's smooth action and easy handling, and concluded with some tips on proper sighting techniques. Nick the Navigator abruptly cut him out by saying, "Pete, you sure may know a lot about kielbasy and guns, but for hobbies there's nothing that beats playing with money."

Meanwhile none of the crewmembers saw the big Boeing 747 going the opposite direction that passed a scant 1,000 feet above them.

Nick was busy telling about the current price of pork bellies on the commodities market and the difficulty of picking good investments in these days of gold fever and double-digit inflation. The noise of the voices going back and forth grew heated when suddenly Big Mike's voice shut them up. "You guys all sound like a bunch of chickens in a henhouse. What's going on up there anyway?"

Sam's smooth voice eased Mike's concern as he let him know that they'd only been talking about hobbies that were near and dear to their hearts. Big Mike's response was to tell them that they all were full of blarney and what they needed was nothing more than a sound physical fitness program, topped off by coming out for the squadron football team. "There's nothing like lifting weights, knocking down tacklers and working up a good

sweat to make your whole day."

Passing ten degrees west longitude, none of the crew heard the call from Croughton Airways to come up again on frequency. Twenty-First Air Force had called Croughton to have them advise the crew that the weather throughout Germany was rapidly deteriorating to below minimums, and they would have to divert to Mildenhall.

Meanwhile, on board the aircraft, Pistol Pete has just begun his seminar on advanced shooting techniques as London Airways called on the UHF radio to check their routing.

"MAC 70777, confirm Frankfurt as your destination," came the voice in clipped cockney tones.

"That's a charlie," drawled Sam in his modified American version of the same vernacular.

The controller then advised, "The weather seems to be getting a bit sticky across the channel."

Sam "rogered" the controller and told the crew that they would get an update further on, using the UHF radio. "It can't be too bad or Croughton would have called back," he thought. Unknown to the crew, the cold front that was supposed to have moved rapidly off the North Sea had instead slowed down and started an occlusion process. Frankfurt was now below minimums with fog and Ramstein was rapidly deteriorating as well. The Frankfurt Command Post and MACE were frantically trying to reach MAC 70777 to divert the aircraft to Mildenhall.

Nearing the Dutch-German border, Sam finally asked Tony to give the Frankfurt Command Post a call as the C-5 approached UHF radio range.

"Frankfurt Command Post, how do you read MAC 70777?" queried Tony in his smoothest tones.

"Roger, MAC 70777, we've been trying to get hold of you," answered the Command Post. "Be advised you are to divert to Mildenhall, Frankfurt and Ramstein are both below minimums."

Sam's eyes slammed fully open and he yelled to Nick, "Hey, did you copy, nav?"

"Standby, while I see if we've got enough gas," Nick answered. The interphone died while an agonizing minute went by, then Nick's voice came back calmly, "We've got enough gas if we turn around *now.*"

Tony called and received clearance while Sam swung the mighty Galaxy back toward the reverse course and rolled out headed for England. Another call confirmed that Mildenhall weather was VFR with only some scattered mid-level clouds remaining after the front had gone by.

The crew settled back, relaxed and their blood pressures returned to the normal range. Sam completed the descent and approach briefings and eased the aircraft off autopilot and down toward the Anglian countryside. Tony finished the checklist and settled back in his seat as the clouds wafted by. He began talking again, this time about the wonders of the British lassies who inhabited the local towns. Sam's thoughts turned from the weather forecaster back to his old Chevy sitting in the squadron parking lot.

The clouds going by were more broken than scattered and the voice of the British controller became more difficult to understand as the interphone chatter picked up. Big Mike's voice again broke through Tony's to ask about the local weather and to request a staff car for his DV seven in the troop compartment. The Galaxy continued its descent toward Mildenhall.

Sam thought of Big Mike's earlier comment about the crew sounding like a bunch of cackling chickens and smiled to himself. The controller issued new instructions for the C-5 to make a turn, but his voice was garbled through the talk on the interphone. Sam had started to tell the crew to shut up when he preempted his words with a gasp. There, completely filling the windshield directly in front of him, was another aircraft.

ABOUT THE AUTHOR

After completing his B.A. in history at Rutgers University, New Brunswick, New York, Major Harold W. Olson entered the Air Force in 1967. Except for a one-year tour in Thailand flying C-47s, he spent the first 10 years of his career in Air Training Command. After finishing UPT at Laredo AFB, Texas, he instructed T-38s at Vance AFB, Oklahoma, and later taught T-38s at Moody AFB, Georgia. After attendting the Flight Safety Officers' Course, he served as a wing FSO and Chief of Safety at Moody AFB, and then moved to Sheppard AFB, Texas, as Flying Safety Officer and Chief of Base Operations and Training for the Technical Training Center. In 1978 he entered MAC and was assigned to Dover AFB, Delaware as a C-5 pilot.

TMF Interview

Up Front in the Stretch Starlifter

TMF: Maj Huntington, we'd like to discuss some recent problems a few crews have had handling the C-141B. First, could you give us an idea of some of the adaptations crewmembers must make to safely handle the B-model on the ground?

Maj Huntington: About the biggest difference is the fact that the fuselage is now longer. The distance between the nose gear and main gear is greater, so it affects your turning radius and turn point. A pilot who is used to taxiing the A-model now has to go further prior to initiating a turn.

TMF: Does that mean that, for instance, during a ninety-degree turn on a taxiway, you would have to go beyond what would be a "normal" turning point?

Maj Huntington: Yes, and another factor, related to this is "tail growth" while turning the B-model.

TMF: You mean because of the longer distance between the main gear and the tail that the arc scribed by the T-tail is larger than before?

Maj Huntington: Exactly, so crews will have to be more cautious and make sure they have adequate clearance. Another problem is the fuselage being longer between the nose and wings. It's harder to see the engines and wingtips, so for any kind of wingtip clearance while taxiing, both pilot and copilot have to make more of a concerted effort to look and see where the wingtips are.

TMF: So the pilots' view looking out the side windows is different?

Maj Huntington: Yes it is. Actually number two and number three engines are almost invisible from the cockpit compared to the A-model.

TMF: Some crews have damaged the tail of a C-141B during a "normal" landing. What are the differences in flying techniques for approaches and landings?

Maj Huntington: Actually, the only big difference we've seen is in the no-flap landing. We've had to increase the approach speed for no-flap landings in the B-model because the old speeds weren't sufficient to insure adequate tail clearance on landing. We've also changed the procedures for a no-flap to include not deploying the spoilers until the nose wheel is on the ground. When the wheel is off the ground, deploying the spoilers could create a pitch up and increase the risk of scraping the tail. Other than the no-flap, present procedures provide adequate clearance, but, I must emphasize that pilots should always be aware that there is more tail out there and should watch their landing attitudes to prevent scrapes.

TMF: What's it like to fly an air refueling mission? What are some of the most helpful techniques?

Maj Huntington: The air refueling mission really starts with the rendezvous. At present the navigator does the rendezvous much the same as in the C-5. That is, it's an electronic join-up maneuver using the radar and the radar beacon, with air-to-air tacan as a backup. Basically, all the pilots do during a normal rendezvous is fly down the track, maintaining headings and airspeed. The aircraft is positioned so that the tanker rolls out about two miles in front to prevent having a long tail chase. Like any new procedure, rendezvous will improve as the crews gain more experience. It's going to change a little bit when we start using the pilot-operable radars, with the pilots picking up a larger responsibility during the rendezvous.

TMF: By pilot-operable radar, do you mean the new color radar we'll start seeing soon?

Maj Huntington: Yes.

TMF: Getting back to air refueling, what do the pilots have to watch as they get closer to the tanker?

Maj Huntington: Once you get behind the tanker, there is closure speed to consider; first in moving toward the tanker, then to maintain a 1,000-foot

separation from the tanker. Once within one mile behind and slightly below the tanker we start a slow overtake, usually about 10 knots, and slowly come up to the precontact position about 50 feet aft of the tanker and below it on a straight line. If you climbed straight ahead from there, you would make contact with the boom and be in the middle of the refueling envelope. Flying the precontact position is not quite as strenuous, because you're not so close—sort of in loose formation. The closure rate going into the contact position is important because we do throw the tanker around with our bow wave. However, compared to a C-5 the C-141B doesn't have as much effect on the tanker. It seems that pilots, when they're first learning air refueling, do better in the precontact position because they're not in so close, and therefore are more relaxed and don't tend to overcontrol the airplane. But once they're hooked up, and are attempting to stay in the boom envelope, they know that any movement must be corrected immediately, so they tend to overreact, leading to overcontrol, especially in the roll axis. This sometimes causes excessive wing rock. Pilots usually do better in controlling elevator movement unless they don't have the airplane trimmed up. But once trimmed, the airplane will stay right in there. The biggest thing is getting your movements down real small—with short control inputs—so that the airplane does most of the work itself. The other big thing we found is that you have to have an overall perception of what the airplane is doing.

TMF: What about heavy-weight refueling?

Maj Huntington: The airplane is a little more difficult to fly during air refueling if it's heavy mostly because of the power response. If you are a little slow in recognizing the need for more power you might fall back too far before being able to add enough power to stay in position. By the same token, if you are closing, it will take a good deal to stop the momentum. But the airplane flys very well in the air refueling envelope. Several C-5 pilots have air refueled in the B-model and they had very little trouble sliding right in and maintaining their position.

TMF: Describe the pilot's crosscheck routine during AR.

Maj Huntington: Initially the easiest thing to watch is the flight director lights. They will tell you whether you're high or low or if you need to come in or back off. You can get the azimuth by watching the fuselage. But one of the first things instructors try to get you to do is to look away from the flight director lights because they are what we call "too late" lights, particularly in a heavy-weight situation. Once the flight director tells you that you're forward and need to move back it may be too late because of the time lag between recognizing the light, making a control input and having the airplane respond. What you need to do is look at other places on the tanker. We use things like the outboard engines, the little bubbles on the wings or the boom operator—anything to get a general perception of the whole airplane in order to pick up small movements early.

TMF: While you're very busily staying on the boom, what are the other crewmembers doing?

Maj Huntington: First, the copilot is trying to make sure you're safe. He also monitors the disconnect button so that if you have to do a breakaway, he is ready to push it. But he's basically a safety observer during the refueling. The navigator's role because of the rendezvous, of course, is very important. Also there's additional fuel planning associated with an AR mission. The flight engineer's fuel panel has been set up dif-

ferently and he also controls the reset button for the entire air refueling system and must be aware of what's going on. If we have a disconnect, he has to reset the system before we can try another hookup. Besides that, the fuel management is a little different on an air-refueling mission. All the cockpit crewmembers are involved in their particular area of responsibility.

TMF: How about night refueling?

Maj Huntington: Night refueling is generally the same as in the daytime, with the exception that during night refueling you are more dependent on the flight director lights on the tanker. The tanker is well lighted, but you have a different perspective of the airplane and perception can be more difficult. Probably the most significant thing about night refueling occurs when you run through intermittent clouds while you're either close to the boom or actually hooked up. The reflection off the lights can do strange things to your mind. I recall one night I was flying an AR mission and we ran through some wispy little clouds. They weren't solid—just little puffy clouds. Well, I could swear I was in a 30° dive. There was no doubt in my mind at all that we were going down toward the ground. I've heard of other pilots having a similar vertigo experience, describing it as a steep climb—a feeling of going almost straight up. That one time, though, it got so bad I had to break off. Even though I forced myself to look down at my instruments and saw we were straight and level, my middle ear kept telling my mind we were diving. But induced vertigo will always be with us under the right conditions no matter whether we're air refueling or doing something else.

TMF: Are we able to carry passengers while air refueling?

Maj Huntington: Yes. In fact, we've already carried passengers on air refueling missions.

TMF: Ever have any problems with fuel leaks during refueling?

Maj Huntington: No, in fact the C-141B has an advantage in this respect because all refueling plumbing is external until aft of the cockpit, leaving little chance of internal spillage into the cockpit if some failure occurs causing a leak.

TMF: Now the inevitable question: How do you feel about the refueling hump on top of the stretch Starlifter?

Maj Huntington: I like it! It gives the airplane character and along with the longer length it really improves the overall appearance of an already good looking airplane.

TMF: We agree! The hump has a tendency to grow on you after a while and besides there is already a precedent for flying "The Hump" in the airlift business.

You mentioned the pilot-operable radar. Are we coming to the point where we're going to be able to leave the nav at home and go do air refueling?

Maj Huntington: We're not there right now, but we will be in the future. On those aircraft that don't have station keeping equipment, there's eventually going to be only one radar, and that will be up front. Navigators could reach the radar controls on the center console if they sat in the jump seat. But they would have a difficult time reaching

TMF: Is the radar part of the stretch mod?

Maj Huntington: No. It's a separate modification.

TMF: What's your overall evaluation of the stretch Starlifter?

Maj Huntington: The airplane performs well and everyone that flys it likes it. It has good handling characteristics, just like the A-model. Air refueling is a challenge, besides being a lot of fun, and it gives you a good feeling to be able to do it.

TMF: Thank you, Major Huntington.

ABOUT MAJOR HUNTINGTON

Currently assigned to HQ MAC Aircrew Standardization and Evaluation Division, Major Dean Huntington is a native of Lakeside, Arizona. He received his bachelor's degree in business from the University of Arizona, along with his commission through AFROTC. He holds a master's degree from Webster College, St. Louis, Missouri. After completing UPT at Vance AFB, Oklahoma, Major Huntington was assigned to Travis AFB as a C-141 pilot. He later served in MAC's "Strategic Airlift University" at Altus as a C-141 IP, flight examiner, and assistant squadron operations officer in the 57 MAS. Major Huntington has over 3,900 flying hours in the C-141 and was air-fueling qualified in the C-141B in May 1980.

Down and Out

Here's how helicopter pilots can get a sinking feeling at the bottom of an approach

An H-3 turns final approach to a remote landing site. The pilot has planned to avoid terrain hazards by using a steep approach with low airspeed. After beginning descent, he sees he's going to overshoot. He eases in aft cyclic and reduces collective, attempting to salvage the approach. As the big chopper nears the correct descent angle, the pilot pulls up more on the collective—but the helicopter goes down faster still, almost falling. With full power applied, the helo smashes into the ground, short of the landing site.

There were no equipment failures and according to the performance charts, there was adequate power available for the approach. The helicopter and every system on it operated perfectly, right up until impact. Why, then, was the pilot unable to stop the descent? The answer lies in one of the most insidious and least understood hazards of helicopter flying—"settling with power"—a condition almost always resulting from incorrect pilot technique.

But what exactly is settling with power? Whether you call it "power settling" or the more commonly used term, it has been around a long time and is drummed into every helicopter pilot during flight training. When an aircraft settles with power, the usual vortex systems of air flow are altered, and a separate one emerges. The air displaced by the rotor system recirculates in a toroidal (doughnut) shape, in effect, transferring the air from beneath the rotor system, around the edge of the tip-path plane and back through the rotor disc. These vortices lie in the plane of the rotor and are continually recirculated. It's analogous to a helicopter flying cozily in a vast closed container—but the container itself is falling at a fatal velocity. The helicopter is no longer entering a body of "fresh" air continuously, but is flying (or falling) through its own downwash. This condition reduces the lift produced to almost nothing.

In order to establish a power settling condition, the pilot must actually make a number of simultaneous errors. Even helicopter training instructors trying to demonstrate this situation at a safe altitude often find it difficult to achieve power settling deliberately. The helicopter must start at a low power setting, low airspeed (usually close to translational lift speed), and a high rate of descent (essentially, a steep descent with some power applied).

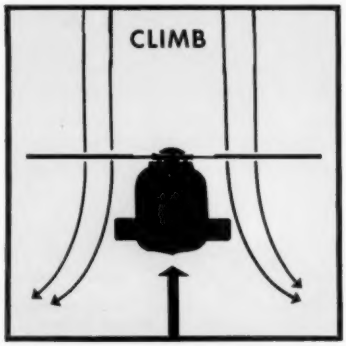
With these factors in mind, try and pick out the errors made by another aviator who inadvertently got trapped into a settling with power situation. The pilot of an Army OH-58 began an approach to drop off two passengers at a tactical field site. He made his final approach with the aircraft oriented into a 10 to 15-knot wind. At about 15 feet AGL, however, he suddenly decided to change his heading so as to land near a parked AH-1. He applied right pedal and a slight amount of right cyclic, turning the aircraft approximately 140 degrees to the right while maintaining three to five

knots of forward groundspeed. With the aircraft now in a downwind position, the pilot noted he had to apply a slight amount of aft cyclic to prevent a nose-low attitude. He also noticed the aircraft was descending. Although he applied 95 to 100 percent power in trying to stop the descent, the aircraft continued its downward movement until finally hitting the ground—hard.

In the pilot's words: "Out of nowhere, we lost all sorts of lift. I didn't think we could lose that much lift. I immediately applied power and aft cyclic as the aircraft began to settle. The rate of descent kept on increasing as I continued to pull in power, attempting to cushion the landing. We had a little forward airspeed as we hit the ground.

"I believe the power I had pulled in earlier had just begun to take effect because we came back off the ground . . . the aircraft began a very slow, gentle clockwise turn. I thought it was the wind. I was not very concerned at that time. I was in the process of adding forward cyclic to stop the aircraft's slight rearward drift. The left rear skid dug into the ground and we rocked back and to the left . . . the aircraft hit again, and I believe that is when the tail rotor separated from the aircraft, because at that point we started spinning just above the ground. The spin was very rapid and I couldn't tell how many times we went around—at least twice, if not more. I put the collective down and the aircraft slammed back down to the ground and to a halt . . . I cut the fuel, turned off the battery and got out."

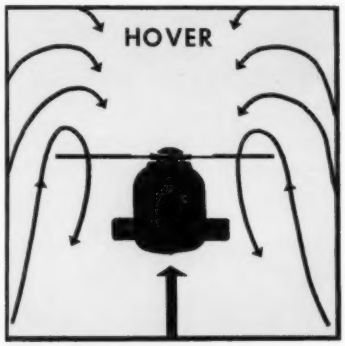
Although no injuries resulted from this mishap, the cost to repair the damaged chopper was considerable. Like the hypothetical H-3 accident, the very real Army mishap resulted from coincidental pilot mistakes. As one investigator stated: "The pilot exercised poor judgment by abruptly applying right pedal and the right cyclic at an altitude of 15 feet AGL, contrary to the guidance provided in the operators manual and the aircrew training manual. The abrupt 140-degree right turn, with little or no forward speed, placed the aircraft into an approximate 10-knot downwind condition. This improper flight control input resulted in the aircraft settling with power. The pilot was unable to stop the descent, and the aircraft landed hard, leading to subsequent major damage."



Sometimes "true" settling with power is confused with other conditions that may, on the surface, look like it. As a refresher, compare the diagrams of the types of vortex systems present during zero-airspeed climb, hover, autorotation and settling with power. During a climb, air flows downward through the rotor. Although three distinct vortex systems exist in the wake of any propeller or rotor, the essential flow may be simplified as shown.

Likewise, when the helicopter is hovered, the airflow is still downward through the rotor system. However, this air is picked up from a lower level, and constantly moves through the rotor. During autoratation, also referred to as the windmill brake state, the airflow is upward through the rotor system. When a helicopter settles with power, the altered airflow reduces lift drastically.

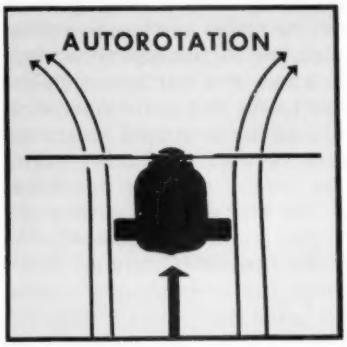
A look at some examples of mishaps commonly (but erroneously) attributed to settling with power can help us understand this phenomenon so that we can better avoid it. First, consider a helicopter that takes off into a 20-knot headwind on the lee side of a slope. After reaching an altitude of 50 to 75 feet and attaining an airspeed of about 50 knots, the pilot begins a 180-degree turn. As he completes the turn, the aircraft begins to lose altitude. The pilot reduces airspeed and applies full power, but the aircraft continues to lose altitude until it finally crashes.



In this example, the pilot made a sharp turn in a known downdraft area. During a turn, more lift is needed to maintain altitude. This is normally done either by sacrificing airspeed or by increasing pitch. The pilot tried both but was unsuccessful because he was operating in a severe downdraft. He should have reached a safe altitude and built up sufficient airspeed while operating in a known region of a downdraft before attempting a turn. This was not a

true case of settling with power.

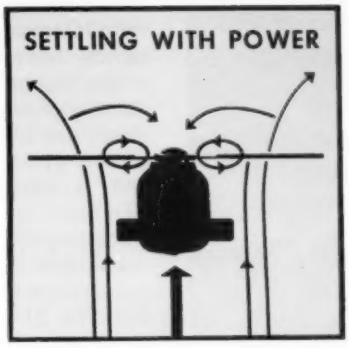
In a second example, we find an Army pilot performing a test flight to check the effectiveness of the tail rotor. He zeroes the airspeed and enters autorotation at 1,000 feet above the airfield while headed into a 15-knot wind. He then elects to make a series of small turns while traveling backwards over the ground instead of making 360-degree turns. At 400 to 500 feet AGL he senses he is falling too fast and he applies power. At about 150 feet, he starts to apply pitch. When the aircraft is about 25 feet above the ground, the pilot notes the rate of descent is excessive, and he applies full pitch and power but the aircraft crashes.



In this situation, the aircraft was at an altitude of 500 feet and the rate of descent was approximately 2,400 fpm; at 150 feet, the rate was the same. This meant the helicopter would reach the ground in four seconds. It is doubtful if any pilot could have made a successful autorotation or power recovery under those circumstances. Beginning the maneuver at an altitude of only 1,000 feet, delaying power recovery, and failing to regain airspeed before reaching a minimum of 500 feet showed poor judgment. However, here again, the true cause was not settling with power.

Finally, let's look at another accident. This one occurred a number of years ago and involved a Royal Australian Air Force pilot. The importance of the mishap lies in its ability to show the three conditions required for true settling with power, and how readily they can occur simultaneously during flight when pilots fail to remain consciously aware of them.

This pilot was making an approach to a pinnacle. The approach was steeper than he had intended, however, and he allowed his airspeed to decrease to below 10 knots while the aircraft was still 30 feet in the air. As the helicopter began to settle to the ground, no amount of power could stop the descent. In this case, two conditions conducive to settling with power were present during the first part of the approach. The rate of descent was more than 400 fpm, and 20 percent or more power was being applied. When the airspeed decreased below 10 knots, the third condition was satisfied, and the aircraft promptly settled with power. The mishap report summed up the problem: "The phenomenon of settling with power . . . involves high vertical rates of descent and reduced cyclic control effectiveness. This condition is entered following a low-speed, partial-power descent where the airspeed is inadvertently zeroed. Further, the characteristics of power settling are very similar to the feel of a stall in conventional aircraft. The recovery procedure is also approximately the same, i.e., drop the nose and accelerate into forward flight. If this cannot be done, recovery can also be made by reducing collective pitch to a minimum, but this, of course, results in considerable altitude loss." So really, we're talking about recovering by removing the "leg" upon which power settling stands. If airspeed is increased, power settling will disappear as induced flow replaces the recirculating vortex flow.



Unfortunately, since no physical evidence of power settling will be discovered, it's unlikely that the term will appear in the safety investigation as more than a possible cause factor.

The point in all this is clear. Avoidance is the first and strongest line of defense in preventing power settling. But if the time ever comes when you discover added power only increases your rate of descent, prompt recognition and split-second corrective action can still save the day. However, if you let yourself get trapped by low power, high descent rate, and low airspeed, with not enough altitude to recover, you will, in all probability, be an unwitting passenger on a helicopter with the flight characteristics of a falling rock. Staying aware of the conditions that lead to settling with power and avoiding the trap will insure that you will stay up in the air and in commission—not down and out!

Arresting Facts

Stop and think about the type of cables across *your* runway.

With the right hand hydraulic system suddenly Tango Uniform, the C-9 crew decided to call a Conference Skyhook to discuss their options with experts on the ground. The loss of the right system necessitated an alternate gear extension, and because they were fast approaching their home base on the last leg of an air-evac mission, the crew needed to decide soon on the best course of action. After due deliberation, they opted to use the emergency extension procedure which released the uplocks and allowed the landing gear to "free-fall" into a down and locked position. With this method of lowering the gear, however, the gear doors don't come back up after the wheels are lowered—they remain extended with the ends actually dangling slightly below the tires. To prevent serious damage to the doors as they scrape the runway after landing under such conditions, their bottom edges have skid pads.

The gear-lowering procedure worked as advertised and the crew then called to ask the location and status of runway arresting gear. They were well aware of possible damage that could result from catching a hanging gear door on a barrier cable. After getting what they thought was valid information on the status and location of the runway barrier cables, the Nightingale crew made a landing beyond where the last approach-end cable was supposed to be. But to their surprise, there was a BAK-13 barrier stretched across the runway just in front of their touchdown point. They winced as the C-9 barreled over the three-inch-high cable at 100 knots or so, extensively damaging the main gear doors and fuselage.

The C-9 is not the only MAC aircraft that's susceptible to damage from arresting gear cables. Both the CT-39 and C-130 flight manuals caution crews about possible harm which can result from rolling over cables at high speeds. With the CT-39, certain combinations of speed brake and gear door positions can do considerable damage. The Herk's nose wheel door and antennas on the bottom of the fuselage can also take quite a beating from cables bouncing upward after being trounced upon at higher-than-normal taxi speeds—occasionally a C-141 gets grabbed also.

With mishap prevention in mind, we offer a quick review of the various arresting systems MAC airplanes run into (and over) every day, sometimes with distressing results. These basic facts can be tucked neatly into the recesses of any crewmember's cranial computer, ready for instantaneous recall, if the need arises.

MA-1/MA-1A

Probably the first arresting gear most Air Force pilots encounter is the MA-1A barrier net—the type installed in the overruns at pilot training bases. It is normally equipped with a nylon net that has a steel pendant cable running along the bottom of it for engaging the main landing gear

struts after the nose strut makes contact. If the base has aircraft with tail hooks, an additional steel cable can be pre-tensioned across the runway, 35 feet or more in front of the net, to snag the aircraft's tail hook. Besides the net, the most obvious trademarks of the MA-1A are the huge ship's anchor chains connected to the cables and laid out on either side of the runway. These pay out a link at a time to absorb the energy of the engaging aircraft. Because they are almost always located in the overrun, MAC crews seldom notice them unless they happen to make an unscheduled excursion into an MA-1 at a base which sports this type of runway paraphernalia.

BAK-9

Instead of using an anchor chain to absorb energy, the BAK-9 uses standard B-52 aircraft wheel brakes installed on both sides of the runway. As the fighter-type aircraft engages the cable, tape-wound reels propel a chain-driven hydraulic system which in turn supplies the appropriate amount of hydraulic pressure to the B-52 brakes. The barrier has those familiar rubber discs which support the pendant cable (hook cable) and keep it about 3 inches off the runway surface. The BAK-9 can be engaged from either direction.

BAK-12

This arrester also is bi-directional and uses B-52 wheel brakes. The cable pendant and support discs are similar to those on the BAK-9. It is a split system with energy absorber units on each side of the runway. The BAK-12 is air transportable and can be installed very rapidly, so it is good for short-notice tactical aircraft support.

BAK-13

When an aircraft engages a BAK-13, it pulls nylon tape off a reel, rotating a turbine filled with an ethylene-glycol-water mixture. The action of the rotor spinning in the liquid absorbs the aircraft energy. Because of the quick rewind time (approximately 90 seconds), the BAK-13 provides rapid recycle during recovery of hook-equipped aircraft in more austere environments.

BAK - 14

With this system, the arresting cable can be retracted into a cross-runway groove when not in use. When raised, the cable is 3 inches above the runway. The system can be hooked up to a variety of energy absorption devices including those used in the BAK-9, 12 or 13.

Armed with these arresting facts, even if you may not yet be able to tell the difference between a BAK-9 and a BAK-12, perhaps you will keep in mind what damage they can do to your airplane under the "wrong" circumstances.

MA–1/MA–1A barrier

Landing Illusions

Believing "seeing is believing" can be hazardous.

by Maj James P. Coe
Associate Editor

Look at Figure 1. Are the horizontal lines in each illustration straight or curved? How about the lines in Figure 2; are they the same length? If you have seen these or similar drawings before you may know the lines in Figure 1 are parallel, and that the ones in Figure 2 are exactly the same length, but how did you *see* them? These are classical geometric illusions, and even if you've seen them many times before, your visual perception of them remains inaccurate.

Psychologists estimate that 80% of our perception of the real world comes from our eyes. Normally we see things quite accurately, but it's possible for us to be deceived. When the deception influences our flying performance, then it becomes a safety hazard. This is particularily true when inaccurate visual perceptions affect the way we land airplanes.

Learning to land involves developing a set of behavioral patterns that allow us to safely control the aircraft. At first we learn what a "normal" approach looks like at the airfield where we are first qualifying in the aircraft. Later, a series of successful approaches and landings gives us an idea of what a "normal" approach to a "standard" aerodrome looks like. However, stresses on our body and the airfield environment itself can both affect our visual perception. Sometimes flying our average looking approach and landing can be quite dangerous.

Stress

Recent research has discovered the ways emotions affect our vision. For instance, measurable shifts to far or nearsightedness happen when people are under stress. These changes can last from a few minutes to several days. Sudden acute stress, such as a bird striking the windscreen, causes farsightedness. Longer term emotional stresses—anxiety, apprehension, isolation—cause nearsightedness. Either way, an emotion-induced change in vision can affect the quality of flying by changing depth perception, altering cross-check patterns or distracting a crewmember.

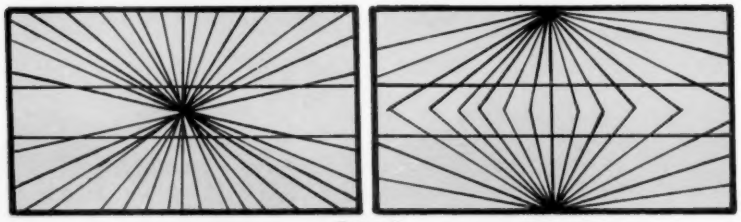


Figure 1.

Environment

Visual illusions, like the ones demonstrated in Figures 1 and 2, have been known for centuries. Scientists have studied vision thoroughly to discover why visual illusions happen. Use the airfield diagram in Figure 3 to try and answer the following problem. You are sitting in the aircraft parked in front of the terminal. Ground control clears you to taxi to runway five via taxiways alpha, echo, whiskey and sierra. When you cross runway 05/23 will you have to turn slightly to enter taxiway sierra or follow a course diagonally across the runway?

Figure 2.

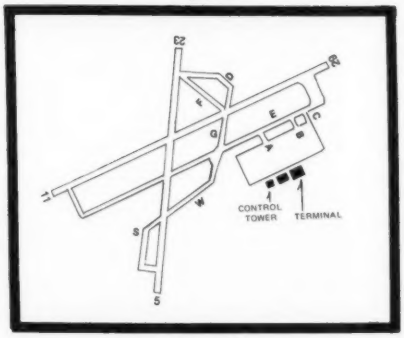


Figure 3.

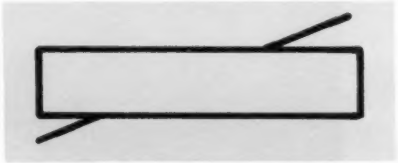


Figure 4, the Poggendorf Illusion.

The correct answer is, "You won't have to turn." Any doubt you experienced was probably caused by the Poggendorf Illusion. Shown more clearly in Figure 4, it demonstrates that an oblique line cutting across two parallel lines may appear to be offset even though it is an extension of the same line. Let's now turn to some landing illusions.

Approach Terrain

You judge your aircraft's approach path based on its apparent position relative to both the runway and the surrounding terrain. An approach flown over ground that slopes down toward the threshold may deceive you into thinking you are too low. The resulting correction to your "normal" glide path will yield a steep approach with an excessive rate of descent. This may result in either a hard or short landing.

Figure 5 shows terrain sloping up toward the runway. Flying over this surface can convince you that you're too high. The normal (and erroneous) tendency is to fly a shallower glide path, resulting in decreased obstacle clearance and a dragged-in approach.

Contrast

Based on visual experience, we normally assume that things which are brighter and more clearly defined are closer than objects appearing dim or hazy. We often use this comparison to help our depth perception, but when contrast cues are in conflict with other information our performance can be degraded. The most serious problem of this nature is the "black hole" illusion.

Figure 5, terrain slopes up toward runway

Figure 6.

At night, the airfield shown in Figure 6 becomes a good example of the black hole. The approach to the airport is over water and the surrounding terrain is more-or-less featureless and has few ground lights. Using visual cues only, an approach into this type of airport is extremely hazardous. Visual perception of distance from the field in this case may be based on the clarity and brightness of the runway lights only, and simulator studies show that pilots frequently misjudge this kind of approach and land short.

Figures 7 and 8 show two other ways that contrast cues can be reduced. Both airfields blend into their background and lose definition. Consequently, based on vision alone, you would probably see them as farther away than they really are.

Runway Slope

A couple of years ago a C-130 crew was delivering supplies into a remote airfield in good weather conditions. The 4,000-foot-long runway sloped upward about 6.7% and ended at the base of a mountain. The pilot flew the computed approach speed of 119 knots. Using visual cues, however, he established a

Figure 7, light runway and light terrain.

Figure 8, dark runway and dark terrain.

steeper-than-normal glide path. The Hercules landed hard and bounced once on the runway causing damage to the ramp and aft fuselage. Figure 9 shows how this type of airfield looks from final approach. Of course you can see the runway's slope, but to appreciate its magnitude, look at the ground-level view of the same runway looking toward the threshold, Figure 10.

Let's explore the geometry that explains why runway slope can dramatically affect your perception of the visual glide path. Figure 11 shows three different runway slope and approach possibilities. The top situation is the "normal" condition. Your eyes are accustomed to measuring the 177° angle between the runway and a standard three-degree glide path. Your perspective of the runway from final approach looks similar to the illustration on the left in Figure 11. If the runway slopes up from the threshold, then the tendancy is to fly down to meet the normal-looking glide slope, causing a dragged-in approach. A steep approach results if you try to fly the "standard" glide slope to a runway that slopes down away from the threshold.

Figure 9, terrain slopes down to threshold and runway slopes up.

Runway Length-Width

Considering the two runways in Figure 12, which looks longer? In answering this question you are using a learned ability to estimate the length of two parallel lines based on their apparent convergence due to perspective. However, increasing or decreasing the distance between the lines appears to change their length. In the illustration, the lines representing the sides of the runway are the same length. Variations in runway width can obviously mislead crewmembers. Also, because your perspective on final approach is influenced, you will usually believe the aircraft is lower than it really is while approaching a wider-than-expected runway. If you combine runway slope and length-width illusions, visual approach cues can become extremely unreliable.

Weather

Rain and fog have varying effects on pilots' perceptions of an airfield. Heavy rain causes it to appear less clear and lights to be dimmer, and the runway looks farther away than it really is. On the other hand, a little

Figure 10, looking toward threshold at ground level.

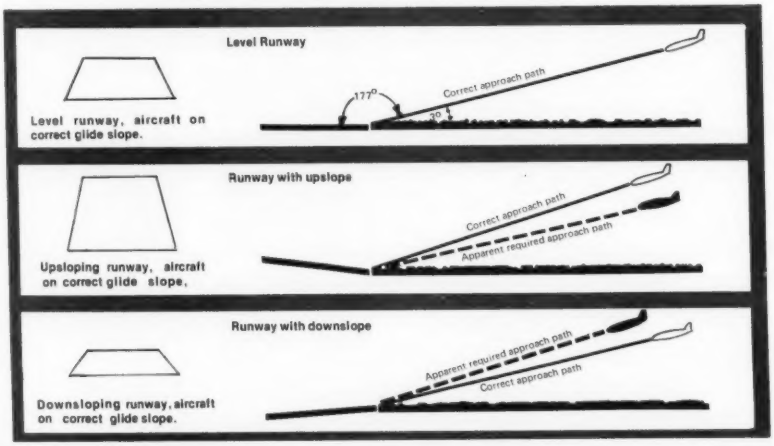


Figure 11, runway slope and perspective.

moisture on the windscreen may have a magnifying effect and make the airfield environment look closer, especially at night when lights appear relatively brighter under these conditions.

Shallow fog has effects which are also more hazardous at night. The whole approach and runway light system may be visible from high altitude even when a low RVR or prevailing visibility is reported. As you descend into the fog, visual references progressively disappear. This may give the illusion that the aircraft has abruptly pitched nose up, which may induce you to react with control inputs in the opposite direction. The risk of striking the ground with a high rate of descent as a result of an erroneous correction is very real.

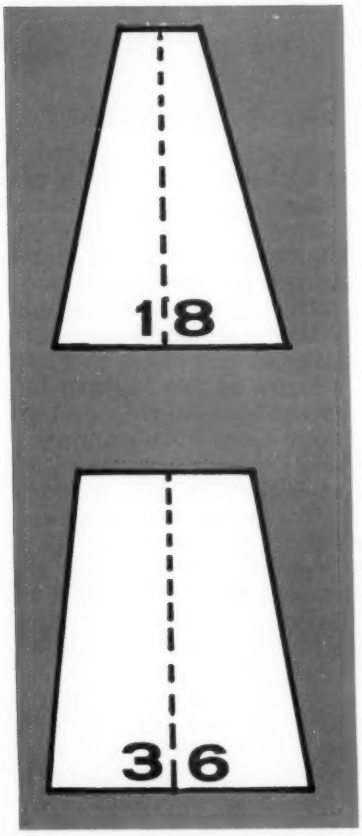


Figure 12, runway width-length relationship.

Fixation

Attention concentrated on one cue or a limited set of cues inside or outside the cockpit is fixation, and it can be fatal. Target fixation is a recognized problem among fighter aircrews who fly ground-attack missions and specific procedures have been developed to help prevent accidents due to overconcentration on the target. In the airlift business, fixation on a narrow part of the runway environment can cause pilots to lose depth perception resulting in degraded aircraft control. Runway or aimpoint fixation is fairly common among inexperienced pilots just learning to land. Most pilots can remember concentrating so hard on getting the aircraft into a designated touchdown zone that they ignored airspeed or rate of descent until their IP called it to their attention or sent them around.

Bad weather or darkness can remove many visual cues from the airport environment so it becomes easy to fixate on the few cues that may be left. If you visually home-in on what you can see outside and ignore all other indications of flight path, your chances of missing important aircraft control information are greatly increased.

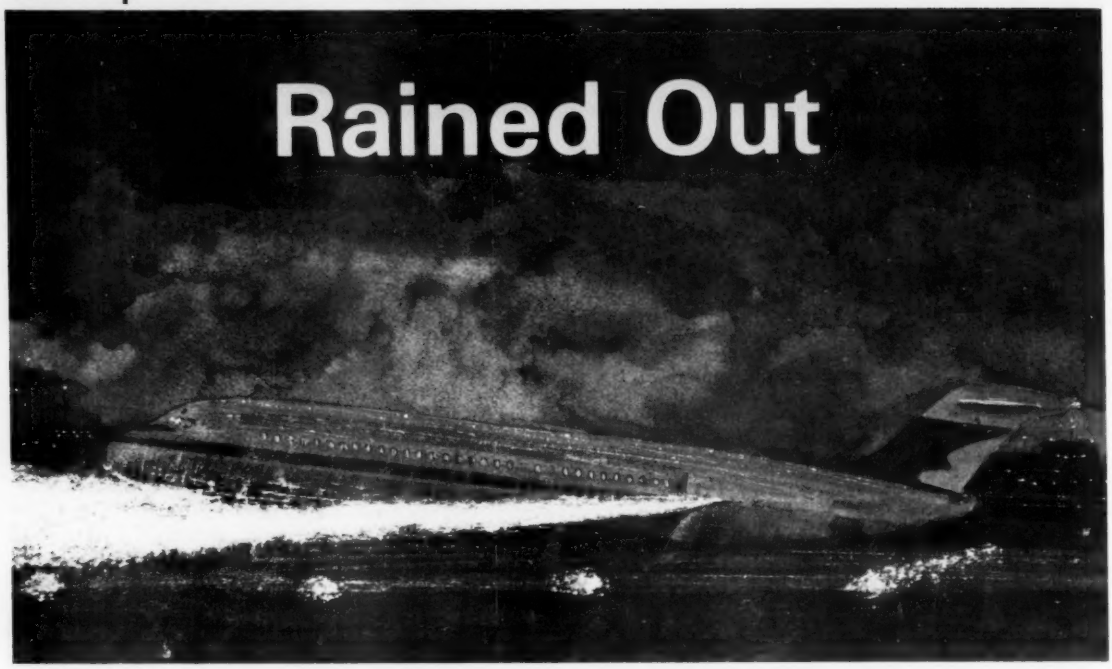
The best preventive measures for fixation are a good crosscheck and crew coordination. Keeping your attention moving in the landing environment will force you to see more of the cues available. You must compare not only your position relative to the aim point, but also to the entire runway—or as much of it as you can see. Good back up from a copilot or another crewmember can draw your attention to inadequate airspeed or sink-rate control before they get so far out of limits that recovery before ground impact becomes unlikely.

More experienced aviators reading this article will probably recall seeing nearly every illusion described. Because of their experience their susceptibility to landing illusions is reduced. However, other factors such as fatigue, poor night adaptation, hypoxia due to smoking, and overconfidence can make any pilot susceptible to landing illusions. Fortunately, preventing mishaps due to misperceptions of visual approach cues is fairly easy. The keys are good preflight planning, using instrument references, and crew coordination.

When planning an arrival to an unfamiliar field, or one with known misleading illusion characteristics or weather, you should carefully review the expected physical appearance of the runway environment and surrounding terrain. If an Airport Qualification Program is available, it will often point out hazards and give you a real picture of what the airport looks like. Although most MAC aircraft are required to fly precision instrument approaches at night (when available) setting up your instruments for approach guidance even when making a day, visual approach gives you an important safety backup. Finally, assistance from the other pilot and crewmembers can help keep you out of trouble. A good approach briefing should tell them exactly what their duties will be during the anticipated approach, including what you want them looking for during visual approaches. With conscious preparation and awareness, a professional MAC crew can safely land their aircraft in almost any environment.

Mishap with a Moral

Rained Out



The DC-9 was on a commercial passenger flight with several stops. Approaching the last destination of the trip with 91 passengers aboard, the captain was flying the airplane from the left seat. ATIS reported runway 34 in use, winds 340° at 25 knots with gusts to 35 knots. Sky condition was 2,500 feet broken with showers in the area. About 30 miles from the airport, approach control cleared the flight to 3,000 feet, told the crew to expect an ILS approach to runway 27 and advised that the winds had shifted to the west at about 30 knots. When the flight was 18 miles from the airport, they were cleared for the ILS approach and the weather updated to broken clouds, visibility 6,000 feet in heavy rain and winds 240° at 30 with gusts to 40 knots.

The two weather reports also highlighted rapidly changing surface pressure and dropping temperature, indicating a cold front was passing the airport slightly earlier than originally forecast. The airline captain figured they probably would encounter a wind shear as they passed through the front, so he elected to shoot a 25°-flap approach. He then calculated an approach reference speed (V_{ref}) of 122 knots for a normal 50°-flap approach and added 30 knots to account for reduced flaps and strong, gusty winds. He told the first officer that V_{ref} would be 152 knots, but didn't brief the approach further.

Closing on the localizer course at 2,000 feet MSL and 235 KIAS, the crew could see the airport terminal buildings and the first half of the runway, but not the tower. The controller reported that tower visibility was about 6,000 feet in heavy rain, and that the approach lights were on bright.

With the rain increasing as they passed 1,500 feet, both pilots went to instrument references. The flyers mutually confirmed approach minimums and missed-approach instructions. At 1,000 feet, with the IAS still well above approach speed, they turned on the windshield wipers. Seconds later the right-seater made a company-required call at 400 feet AGL (800 feet MSL). He also told the pilot he could see the high-intensity approach lights. From this moment on, both cockpit crewmembers concentrated most of their attention outside the DC-9. The captain later estimated he kept the flight instruments in his cross check until about 200 feet AGL. The first officer said he stopped looking inside at about 300 feet.

Looking out the windscreen the visibility was very poor. Rain obscured the runway lights and the approach lights appeared diffused. Neither

pilot saw the runway, so they concentrated on scanning for the green threshold lights. At 100 feet AGL, the AC felt the airliner sinking rapidly. He reacted by increasing pitch, but failed to add power.

Just as the pilot pulled on the yoke, the copilot spotted the threshold lights and commented, "We're looking a bit low." Seconds before the DC-9 impacted the ground, the right-seater warned, "You're going to hit the lights!" Both pilots felt the landing gear strike the ground and the approach lights.

The aircraft touched down in a near-normal landing attitude on the main gear about 600 feet short of the runway. Rolling across the grassed area, the aircraft struck six approach lights in the last four rows leading to the runway. The nose gear touched down on the main runway just beyond the threshold. The DC-9 slowed on the runway and then taxied to the terminal where the passengers disembarked.

Analysis

In IMC conditions the airline expects crews to fly a monitored approach. The first officer flies the airplane and stays on the gauges until touchdown. The captain makes the decision to land and takes control of the aircraft for the landing, or orders a go-around which the copilot flies. Although the likelihood of an instrument approach was indicated when the flight was still about 30 miles from the airport, the captain chose not to brief such an approach. Apparently he didn't even intend to fly an instrument approach, but wanted to do the visual approach and landing himself. This was contrary to both common sense and company policy.

Company operating standards require a 50°-flap landing under nearly all conditions in the DC-9. The 25°-flap approach is normally used for single-engine situations and circling approaches, and airspeed is then increased 10 knots over normal V_{ref}. Company procedures allow pilots to increase approach speeds for wind conditions up to 50% of strong winds and 100% of gust factors, to a maximum of 15 knots. The reduced-flap/high-speed approach set the crew up for additional problems as they descended on final.

The pilot probably was not familiar with 25°-flap approaches—or at least failed to consider how the aerodynamics of his aircraft would be affected. Simulator tests showed little difference in deck angle and required power between a 25°-flap, 170 KIAS approach, and a 50°-flap, 140 KIAS approach. During the approach the captain selected the attitude and power setting that he normally flew for a 50°-flap approach, resulting in 20 to 30 knots extra airspeed throughout the descent.

Airline company policy required cross-checking between the two pilots aboard the DC-9. The pilot not flying the approach is expected to call out airspeed deviations of more than five knots and any descent rate over 800 fpm when below 1,500 feet AGL. During the approach, the copilot either didn't notice the high airspeed and high sink rate, or chose not to point them out to the captain.

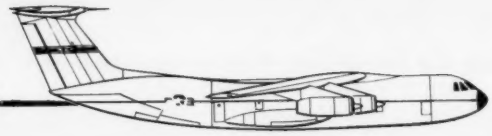
The flight encountered a windshear about a minute before touchdown. With strong and gusty winds quartering from north to west, the aircraft was in a crosswind condition as the approach started. Further down final, the winds swung around to the plane's nose. When this happened the IAS increased 15 knots to 195 knots and the rate of descent decreased to near zero. As the DC-9 crossed the shear, it suddenly ballooned above the glide path, and afterward, the airliner's rate of descent increased to 1,200 fpm and then to 1,500 fpm when the pilot attempted to rapidly recapture the glide slope. With the airspeed still high and the throttles at a low power selection, the crew was set up for an unstable final approach. In actuality, by carrying extra speed on final, they had played the expected windshear incorrectly.

The captain decided to continue the approach below ILS minimums (200 feet AGL), because he believed there were adequate visual references for a safe landing. Heavy rain created a visual illusion that caused the pilot to think the field was closer than it actually was. When part of the runway was blocked from view by the downpour, the length-width perspective was also altered so that the runway looked wider and shorter. This probably caused the AC to believe he was both closer to the field and higher above the ground than his true position. Rain on the windscreen magnified the approach and runway lights making them look brighter—or at least bigger—further enhancing the illusion of being too close. Correcting for his perceived position, the left-seater accepted a high rate of descent to get the airliner onto the runway.

The Australian Department of Transport determined that the probable cause of the incident was "the approach to land was continued below the minimum altitude, when external reference was insufficient to permit the completion of a safe landing."

—Adapted from Australia's *Aviation Safety Digest*

Flight Lines



Cartoon Offends Colonel

At the same time General Huyser is prioritizing resources for the enhancement of command and control within MAC, I'm concerned that the cartoon published on the outside cover of the March 81 edition of *The MAC Flyer* is working in the opposite direction. The cartoon provides little latitude for interpretation. Endemic to command and control is change. As the vagaries of unscheduled maintenance, weather, and transportation requirements alter available solutions during even the briefest crew rest period, the airlift operations personnel still remain charged with mission accomplishment. As anyone experienced in this career field could attest, decisions are revised as fast as events dictate. To shirk this responsibility would be to stagnate readiness. The airlift industrial fund is fueled by mission accomplishment, not by timidity to responsibility.

The cartoon depicted undermines the integrity of this system and those who serve within it. The suggestion that the duty officer knowingly deceives the MAC crewmember is degrading to our profession. To have this innuendo promulgated within the Command by a publication of this stature is unfathomable.

An apology in the next issue is certainly warranted. Unfortunately, the retraction will hardly erase the impression already formed by the young aircraft commander and crewmembers. How have we contributed to the safety of his mission, or the readiness of our command when we breed distrust within our own ranks?

Colonel Phillip E. Jackey, Jr.
21AF Director Command and Control
McGuire AFB, N. J.

*** We all agree — MAC command and control folks are hard working, honest members of the MAC team. We're sorry you have taken offense where none was intended. The cartoon you cite was suggested by a MAC crewmember and was intended to provide a chuckle for *The MAC Flyer* audience. It is a lampoon of the occasional misunderstandings that occur between crewmembers and command post controllers, and any broader implications or indictments of the system based on it are most unfortunate.**

Professional Praise

Thanks for your fine publication. It is among the two or three best in the world today.

William L. Donovan
Editor and Publisher
Flight Crew

Recycled Samaritans

Here is a photo of a C-131A. Now designated Coast Guard number 5801, it is being used for search and rescue, law enforcement, pollution control, logistics and training missions. A picture of this plane when it was USAF C-131 number 25793 appeared in the Anniversary Issue of *The MAC Flyer*, and I felt your readers would be interested in what has happened to it and some of its sister ships. In addition to such roles as those already mentioned, they were used in patrols to monitor the massive oil spill of "Ixtox I" in the Bay of Campeche in 1979, which caused severe environmental and cleanup problems for the Texas Coast. In 1980, they flew thousands of hours of patrols in response to the Cuban Refugee problem, assisting the distressed and then helping to curtail the travel of pickup boats to Cuba when President Carter ordered the influx curbed. They also aided many distressed Haitian Refugees. Air Force pilots and crewmembers of these grand old aircraft can be proud, because the C-131 Samaritans are still saving lives just like they did when they were Air Force air-evac planes. As a young pilot (650 hours), I am extremely proud to have flown—and look forward to at least another year of flying—this wonderful aircraft that is truly the end of an era for military flying.

Lt JG James Stinson
USCG Air Station
Corpus Christi, Texas

*** Thanks for the photo and your very interesting letter, James. We're glad to hear that the Coast Guard has saved some Samaritans from the "Boneyard" and is keeping 'em flying in pursuit of such worthwhile missions.**

C–131 in Coast Guard colors.

Nomex Notes

Nomex is an uncomplicated material, but it has been the subject of many questions, misconceptions, abuses and just plain untruths. Hopefully, this article will answer any questions you may have and tell you some things you should know about your Nomex flight clothing.

Material

Nomex is a unique man-made material that is permanently fire retardant. It is a special type of nylon that will not melt and stick to the skin like other synthetic fibers. Other synthetics such as dacron or regular nylon melt at about 300° F, and therefore should not even be worn next to the skin while flying because heat transfer through Nomex could be high enough to melt them.

Nomex is resistant to temperatures up to about 700° F. In that range it begins to char and form a dry, brittle residue that can be brushed away when the heat source is removed. Nomex will not support combustion the way most other natural and man-made materials will. For example, if a flame is placed directly on cotton, nylon, dacron, etc., the fiber will start burning and continue to burn after the heat source is removed. In contrast, Nomex will char as long as the heat is applied directly to the fabric, but will not smolder or burn when the heat source is taken away. Nomex will burn, however, when contaminated with flammable substances such as petroleum products. If your Nomex does become contaminated with any flammable product, simply launder or dryclean it and the material will be restored to its original fire retardant state.

Uniform Fit

The Nomex uniform was designed to be worn rather loosely to provide an airspace between the fabric and the skin. This airspace acts as insulation from heat. Your Nomex uniform should not be altered because snugly fitted Nomex eliminates the desirable airspace. Also any alterations or repair done with non-Nomex thread can be a hazard if the flying clothing is exposed to enough heat to melt or burn the thread and detach the seams.

For those of you who may require special measurement uniforms for a proper fit, see your friendly Individual Equipment Office.

Static Electricity

Tests for static electricity buildup were conducted at Wright-Patterson AFB on a variety of materials, including Nomex. There were no significant differences in the generation of static electricity among the fabrics tested. One of the most important safety procedures in preventing an accident caused by static electricity during refueling or rearming is proper aircraft grounding. Another equally important safety procedure is plugging in the bonding wire from the fuel nozzle to the aircraft before the fuel cap is removed and replacing the fuel cap before unplugging the bonding wire.

If your Nomex becomes saturated with fuel, the saturated area should be thoroughly soaked or rinsed in water before removing the uniform to prevent static electricity from igniting the fumes. An Army crewmember recently received first and second-degree burns when his fuel-soaked flight suit was ignited by static electricity as he tried to remove it without first washing the saturated area with water.

Cleaning

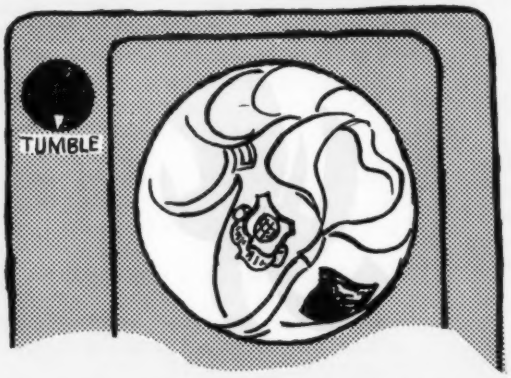
Nomex can be drycleaned safely without altering its fire retardant qualities. Drycleaning solvent remaining in the garment is soon dissipated into the air, thus eliminating any fire hazard. Nomex can also be laundered as many times as necessary and still remain flame resistant. Since it is an easily cleaned synthetic fiber, you probably won't need a full wash cycle. Simply set the washing machine on a short cycle such as "delicate" or "wash and wear," and use your favorite brand of detergent. Be sure to close all the zippers to prevent damage and fasten the velcro strips so they won't pick up lint.

The water temperature you use to wash your Nomex and how you dry it is strictly up to you. Home hot water heaters and dryers do not get hot enough to harm the material. Remember, Nomex is high-temperature resistant and has even been boiled without damage. However, to conserve energy, a warm wash and cold rinse work fine.

When you remove your uniform from the washer or dryer, hang it up so the wrinkles will fall out. You can even iron Nomex if you want to, but don't use starch. If Nomex is tumble dried separately from other materials, an antistatic strip probably will not be required to get rid of static electricity. The rubbing together of dissimilar materials causes the buildup of static electricity. If you live in a cold, dry climate where static electricity is a nuisance, you can use a good brand of fabric softener in the wash or an antistatic strip in the dryer.

Detergents, fabric softeners, and antistatic strips leave a residue which accumulate on Nomex. This affects the fabric's "wickability " (its ability to transport perspiration to aid in evaporation and cooling). You can test your uniform's "wickability" by placing a drop of water on a clean uniform. If the water soaks in within 10 to 12 seconds, fine. If it takes 30 seconds or longer for the water to soak in, or if it simply beads on the material, your Nomex needs to be drycleaned to remove the residue. If you have ever wondered why it was so difficult to dry yourself with a towel from a hotel or motel, it's because they use strong detergents and softeners which greatly decrease the cloth's ability to absorb water.

The best choice for patches and other insignia worn on your Nomex are those made from natural fibers rather than synthetic materials. However, patches made from synthetics do not melt before reaching about 300° F. This temperature is considerably higher than the human skin can stand without damage, so with heat intense enough to melt a synthetic patch, the victim would already be in very serious trouble.



To minimize skin exposure, sleeves should be down, zippers zipped to the top, collar turned up and of course, Nomex gloves should be worn. Wear the gloves under the sleeve cuff to prevent accidental snagging on switches. The turned-up collar of the Nomex flight suit does not completely cover the neck. The unprotected neck area, however, makes up less than one percent of the total skin area.

Finally, Nomex is Nomex regardless of the weave, color, or article of clothing. Take care of it and it will take care of you when the heat is on.

—Adapted from U.S. Army *Flightfax*

C.R. TERROR

Our Heavy Helo Honcho diverts into a tangled turn-around.

Looks like we ought to be home in about an hour, Sam," C.R. estimated, watching the DME click off the miles as their H-3 whirled its way southeastward across Florida.

"Yeah, these depot ferry flights are real time builders," commented Sam as he stretched and wiggled in the Jolly Green's left seat. "If our ETA holds, we should get to Patrick before those thunderstorms the weatherman told us about."

"If that Georgia metro-man had ever lived in Florida, he'd know that the weak tropical depression he showed us on the satellite picture would have to do pushups for a week to bring rain to our sunny beaches. Besides, I want to get home early so I can catch Tassels' opening-night act at the Cocoa Beach Disco Cabana. I'll tell ya, Sam, Ms Taylor has more moving parts than this helo. And talk about a great pair of legs—"

"Jolly One, Jacksonville Center, Patrick requests you call Navy Jacksonville on 310.2," preempted the controller.

Before the Rotund Rotorhead could instruct Sam to ignore the diversionary call, the competent copilot raised Jacksonville NAS.

"Glad you called, Jolly One," responded the Navy ops dispatcher. "We've got a DV-six civilian here who needs a ride to Patrick or the Cape. His T-39 pickup crumped. Your command post said you could stop and get him on your way home, over."

Sam turned to his AC for an answer. "Maybe we can wriggle out of this one," said the Sly Skipper. "Ask 'em if they have JP-4 for us."

The long suffering copilot queried the Naval Station. "That's affirmative, the truck will be waiting, sir," was the smooth-talking swabbie's reply.

"Looks like we're stuck this time," conceded C.R. as he banked the helicopter toward the east. Sam made the required flight plan changes with center and scrambled through the nav kit for the appropriate approach book. Finally finding "Volume 12," he opened it to the tacan approach for Jacksonville NAS and passed it toward the Corpulent Commander. "No need for that, m'lad," rebuffed C.R., "I've been into Navy Jax lots of times in everything from Starlifters to Pedros." Sam shrugged and slipped the approach book under his leg.

After a few vectors around Navy Cecil's traffic area, Jacksonville Approach turned Jolly O1 over to tower. Sam reported

five miles west for landing. "Roger Jolly One, cleared to land on the helipad north of air ops near the east end of the ramp. Maintain 500 feet or below within three miles and remain well clear of the duty runway. Traffic is departing T-39, just off runway 09."

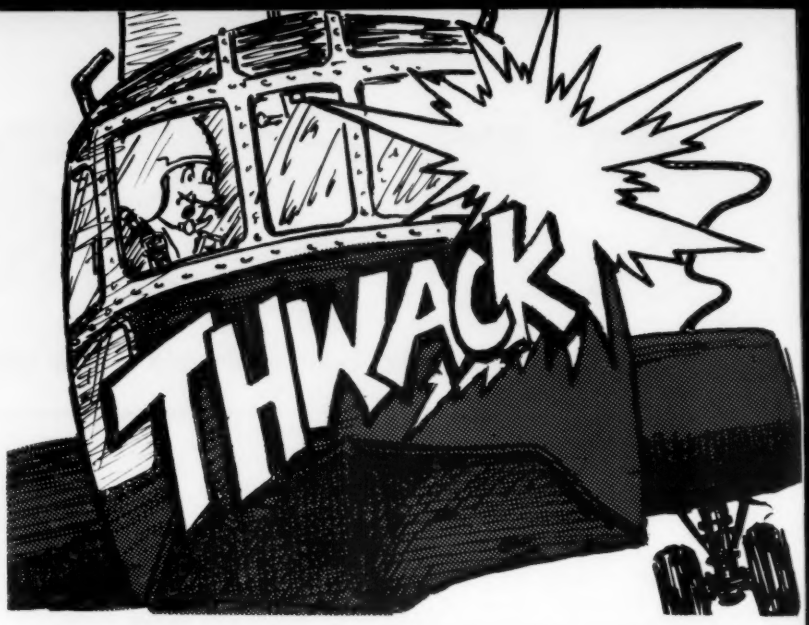
The Heavy Helicopter Honcho proficiently lined the Jolly Green up on the designated landing zone and executed a surprisingly smooth touchdown. By the time Sam was engaging the rotor brake, C.R. was hoisting his generous physique out of the right seat. "All right crew, let's get this machine refueled and ready to go. The early show at the 'Disco Cabana' starts in three hours and I've got a table reserved right down front for us all."

Ten minutes later the Terrorific Trio was still standing on the ramp with no sign that anybody had noticed their arrival. Squinting against the setting sun, Sergeant Torque spotted a sign on a nearby hangar. "Hey Major, that sign says, 'All arriving transient pilots report here'."

"Okay, so we'll report," announced the Pompous Pilot sucking in his bulbous belly and taking up a brisk stride across the ramp. Sammy followed behind and called back to the flight engineer, "We'll send a fuel truck, Sarge."

Inside the office, C.R. and Sam were greeted by a dungaree-clad aircraft repairman, "Good evening, sirs. That helicopter yours?" C.R. nodded affirmatively. "If you'll fill out these forms, I'll arrange for a fuel truck and any other services you might need."

C.R. passed the proffered clipboard to Sam, and asked the Navy man, "How come there's no crew bus, or at least a 'Follow me' truck?"



"Sorry sir, but we don't have a lot of people working this shift—just changed over from day shift, you know. All my helpers are at chow and I've got to stay here to answer the phone," the sailor explained.

"Here ya go," sighed Sam as he handed the completed servicing forms back to the mechanic. "Thanks lieutenant—er captain—ah, sir," replied the sailor. "Air ops is in the next building to the east," he announced pointedly.

The Massive Major turned on his heel and headed for the door. "C'mon Sam, let's find our DV and get back into the air."

After a short trek across the tarmac, the helicopter crew entered base ops and approached the duty desk. "We're supposed to pick up a civilian DV and take him to Patrick," announced C.R. as the dispatcher approached the counter.

"Oh, you must be off the Air Force helo, right?"

"You guessed it."

"Well, while you were inbound, the guy on the day shift took a message from somebody named 'MacDoof' at Scott. Then your command post called and said to send you home. Mr. Ferris' T-39 made it in after all, and we sent him on his way about twenty minutes ago."

"You mean the passenger we diverted in here for has already left?"

"I guess so sir. In fact, our board shows their ETA for Patrick is right about *now*."

"Crimenently! That's just absolutely fantastic!" fumed the Flatulent Flyboy. "Sam, we've been had again!" Remembering Tassels' show, he added, "We might as well take it gracefully, file a flight plan, and get the heck out of here."

About the same time the pair from Patrick entered the flight planning room, a yellow fuel truck stopped in front of the USAF H-3 out on the ramp. Having returned from chow, several transient line mechanics also converged on the Jolly Green. Sergeant Torque reassured himself that they understood how to refuel an H-3, and then retreated to the maintenance office for a well-deserved break.

One Navy man attached a ground wire from the left sponson to the nearest grounding point—the one almost directly underneath the

helicopter. Then the refueler attached the single-point nozzle and started pumping gas into the H-3. By the time Sergeant Torque returned to start his through-flight, the fuel truck was pulling away. The Navy line mech asked, "You want me to stand fire guard with you? I serviced our H-3s until last year."

"Might as well," responded Max gratefully. "When the boss gets here I suspect he'll be in one big hurry. You watch the left side and I'll take the right."

Having finished flight planning, C.R. and Sam were making tracks toward the Jolly Green just as the last glimmer of sunlight faded from the sky. At the H-3, Sergeant Torque greeted them, and affirmed that the helo was fueled and ready to fly.

In a couple of minutes, the pilots had manned their seats and were ready for engine start. Sam read the checklist and the Rotund Right-Seater mumbled responses. The turboshaft engines came to life and C.R. engaged the rotor. Sergeant Torque pulled the gear and tank pins on the right side while the Navy man got the ones on the left and handed them to Max. The flight engineer counted them and, finding the total correct, scrambled aboard the waiting Jolly Green.

"Jacksonville ground, Jolly 01, taxi with information papa," Sam called. The controller accommodatingly responded, "Jolly One, you can do your hover checks where you are and then depart to the east; contact tower on 355.8."

"At last, somebody who understands the 'urgency' of our mission," observed the Hasty Helo Honcho. "Be sure to thank 'em graciously, Sammy."

Starting the hover check, C.R. raised the collective and the Jolly Green smoothly lifted into a five-foot hover. After looking over the gauges, Sam announced, "Instruments look good. Ready to go, boss?"

"You better believe it," responded C.R. pushing forward on the cyclic to gain translational lift. The Jolly Green dipped its nose and slowly started to move. Suddenly the normal symphony of noises was punctured by an ear splitting "thwack" as something ricocheted off Sam's side window. That unusual sound was quickly followed by a series of screeches and groans accompanied by a drop of the rotor speed needle on the triple tach.

Sensing his big helicopter was gravely ill, the Able Aeronaut pulled back on the cyclic to establish a level attitude and started lowering the collective. The Jolly Green refused to respond to the stick and began yawing to the right. In response, C.R. desperately slammed the collective to the floor. Literally dropping from ten feet up, the H-3 impacted the pavement nose wheel first, immediately followed by a crunching main-gear touchdown. Finally, the tailboom arched downward, cracked away from the helicopter's fuselage and struck the pavement with the still-spinning tail rotor kicking up sparks.

In the cockpit, C.R. yelled, "Abandon ship! Every man for himself!" and released the controls. Sam cooly retarded the speed selectors, shut down the engines and switched off the battery. Then he and Sergeant Torque followed their leader in his rapid egress from the mangled rotary-wing machine.

"So what did he ask you, Sam?" inquired the Rotund Rotorhead as his copilot came out of the DO's office.

"Same old question, boss. Just wanted to know if I did any kind of exterior inspection," answered the copilot dejectedly. "I told him that you were in a real hurry and decided to do your own walkaround, so I let you." The captain sunk deeply into the overstuffed chair in the colonel's outer office.

"Just like I told the DO, I did my normal pilot's preflight," protested C.R. "I counted rotor blades, checked that three gear were still on the ground, made sure the back door was closed and the front door was open. What more could they want?"

"I don't know" replied Sammy shaking his head.

"I do," came a reply from the inner office's door. Both pilots turned to look at Sergeant Torque. "We all walked right past the thing that nearly did us in," he said raising his right hand to display some fragments of metal cable and a large alligator clip." Looking at Sam, he pointed out, "The male plug from this grounding wire is apparently what bounced off your window, sir." Sammy winced. "The colonel said the investigations were all complete and we could keep these pieces of junk if we wanted to. Personally, I'm going to have a section of the cable set into a lucite paperweight to remind me to *always* check for wires and plugs when I preflight."

"I'm definitely taking a piece too," echoed Sammy.

"And I want the alligator clip," asserted C.R.

"You what?" asked Sammy and Max in unison.

"I need proof we were unavoidably delayed at Jacksonville, boys. Tassels still hasn't forgiven me for missing her opening performance, but this little souvenir should help me prove my story."

QUICK STOPPERS

Cirrus Is No Laughing Matter

Just about this time last year a CT-39 was cruising along at FL 370 when it entered cirrus clouds. Almost immediately the crew had reasons-a-plenty to wish they hadn't blindly crossed paths with the fluffy obstacles when they were caught by an embedded thunderstorm. Moderate to severe turbulence ricocheted their Sabreliner all over the sky. Heavy rain and moderate rime icing covered them so thoroughly that before they could establish radio contact on UHF for a clearance to climb out of the bad stuff, their number two engine flamed out. Squawking 7700, they went ahead and descended to FL 160 without waiting for the formalities. As they passed FL 200 they were able to get their right hand burner cooking again and diverted into a nearby base for a safe landing. These flyers were lucky—some others who challenged the clouds head to head in recent years haven't been. You may not have thought of it this way before, but if turbulence rips your airplane's wings off at 37-grand, you will have quite a few agonizing seconds to contemplate the error of your ways before you impact the ground with about enough force to flatten a ball bearing.

Ram and Thump

Before the Starlifter crew started their descent to an offload base, the loadmaster briefed his team of Army truck drivers on the upcoming engine running offload (ERO). Once in the parking place, the loadmaster started directing traffic off the C-141A. The scanner was reporting good progress to the flight station when he suddenly heard and felt a heavy thump. He looked forward just in time to see a large truck and attached water trailer rolling aft after ramming the flight-station bulkhead.

The truck driver later said that an aerial port loading team member had instructed him to start his engine. Unaware that only the loadmaster is supposed to give the signal to crank up a vehicle, he started the truck and accidently shifted it into reverse instead of second gear. Seemingly siding with the hidden flaw, the Army driver's foot slipped off the clutch and the truck lurched toward the flight deck. The attack on the aircraft resulted in a damaged latrine door, two bent access panels and a broken flight control pulley.

EROs are added-risk operations and everybody involved in the cargo compartment should take directions from one person, the loadmaster, to help insure coordinated, safe operations.

Almost Ain't Clear Enough

As the C-141 reached final approach fix on an ILS approach the controller gave the Starlifter crew permission to land. At about the same time they were receiving their clearance, the alert flyers watched a C-130 turn base ahead of them in a VFR pattern, proceed on in and land. The C-141 pilot queried approach control about the Herk traffic and was once again cleared to land. Exercising his prerogatives, however, the C-141 pilot elected to execute a missed approach since the C-130 was still on the runway finishing up its landing roll. It doesn't take much imagination to conjure up a vastly different scenario if the Starlifter crew hadn't been on the ball. Air Traffic folks don't intentionally do things to make life more difficult or chancy for us, but they aren't infallible either. It's always good to keep in mind that *we* are ultimately responsible for our own safety, no matter how much "help" we are getting from sources outside the cockpit.

Partial Preflight

Here's a good instrument refresher course question: "How do the pitot-static instruments behave when the static ports are covered or clogged?" A MAC crew recently conducted an unintentional experiment and found out the answer.

The twin-engine transport's airspeed and altitude indications were normal throughout taxi, takeoff and intitial climb. At an estimated 300 feet AGL—that's estimated because the pressure altimeters still read field evaluation—the pilot noticed a drop in airspeed. The copilot's airspeed indicator still appeared to be working fine, but not for long. A few seconds later, both airspeed indicators dropped to zero. Declaring an emergency, the crew maintained VMC and returned to the base for a safe landing.

Quicker than the pilot could finish a writeup in the Form 781, maintenance discovered the problem—tape over the static ports. Placed there for the aircraft wash the day before, it had gone undetected during both the maintenance and operations preflights. Obviously a bit of good luck and good weather kept the inadequate preflights from generating a complete disaster.

DH Disregard

The Navy S-3A was on glide path and only varying slightly with regard to course. During the approach, the copilot had been calling out the altitude every 50 feet on the way down, but inadvertently failed to let the pilot know when they reached the decision height of 150 feet on the absolute altimeter. Even though he rogered the controller's warning of "decision height," the right-seater, who was also preoccupied with maintaining a visual outlook for the runway environment as they got closer in on final, didn't remember answering the call. Finally, at 100 feet, the copilot called the AC's attention to the altitude and the fact that the runway environment still wasn't in sight.

At DH, the pilot had transitioned to a visual search, spotted a light which he thought was connected with the runway setup, and continued his descent at a slightly increased rate. He also picked up a right drift. Five seconds after calling decision height, the controller advised, "You're cleared to land, going below, level off immediately." The copilot spotted a line of blue lights on the horizon, indicating that they were indeed too low, and called for missed approach. With prodding from the copilot, the left-seater added full power, but as it was being advanced, all four crewmembers aboard felt a sickening thump which was followed by smoke in the cockpit. At approximately 1,100 feet from the runway threshold the aircraft had struck small trees just left of the extended centerline. Luckily the smoke cleared quickly along with the pilot's mind, and a missed approach, followed by a safe landing were accomplished despite the tree contact. Unfortunately, the momentary tussle with the treetops did over $200,000 worth of damage to the S-3. How many times have we heard it? "If the runway environment is not in sight at DH, a missed approach will be initiated."

—Adapted from *Approach*

The First Aircraft Seatbelt

One spring day in 1910, Lieutenant Benjamin Foulois was ginning along in his Wright Flyer biplane when he encountered some rough air. As the biplane bucked and pitched, he was bounced up into the top wing and then slammed back down into his seat so hard it knocked the breath out of him. He would have been thrown right out of the Flyer except that he was caught by a couple of truss wires in front of the pilot's seat which prevented him from going overboard. Realizing that he needed some way to remain securely in his seat if he was going to remain securely in control of the airplane, the ingenious pilot made a trip to the Fort Sam Houston Field Artillery Saddlery Shop the next day. There he obtained a leather saddle strap, and on subsequent sorties he lashed himself to the pilot's seat. Voila! Foulois had come up with the world's first aircraft safety belt.

AFTER DEADLINES

AFRES UNIT WINS HENNESSY AWARD for fine food. The 934th Tactical Airlift Group, Minneapolis-St Paul International Airport, Minnesota, a MAC-gained AFRES unit, won the 1980 Hennessy Trophy for their exceptional professional achievement in the preparation of food and neatness of facilities. The 934 TAG has succeeded in making eating in the dining hall a true "dining experience." The Hennessy Trophy is sponsored by the National Restaurant Association.

A RECORD SETTING C-141B FLIGHT departed McGuire AFB, New Jersey, with 67,000 pounds of cargo recently and flew nonstop to Dhahran, Saudi Arabia. The mission covered 6,500 nm in 13.5 hours, using three inflight refuelings by SAC KC-135s. This was the longest operational C-141B mission flown with a maximum cargo load to date. The same flight in a C-141A would have required two days due to refueling stops and crew rest.

TWO ARRS HELICOPTER PILOTS WON THE 1980 CHENEY AWARD. Captain Ronald W. Summers and First Lieutenant Kim F.P. Skrinak from Det 1, 37 ARRS, Davis-Monthan AFB, Arizona, won the award for their heroic rescue of a seriously injured glider pilot. Although a ground rescue party reached the downed flyer shortly after the crash, his injuries were so severe that immediate extraction from the remote area was necessary. Captain Summers and Lieutenant Skrinak were launched from D-M along with a flight mechanic and medical personnel to aid the distressed pilot. Working at night in unfamiliar mountainous terrain, the pilots battled strong, gusty winds to establish a 250-foot hover over the survivor near the face of a cliff. The ground rescue team prepared the victim for air evacuation with the help of the medical crewmembers. He was hoisted aboard the UH-1 and whisked to Williams AFB, Arizona, where he was transferred to a civilian medical-evacuation helicopter. The Cheney Award is presented each year for "an act of valor, extreme fortitude or self sacrifice in humanitarian interest performed in connection with an aircraft."

THE JULY ISSUE OF *THE MAC FLYER* WILL ANNOUNCE WINNERS of the 1981 MAC Flying Safety Writing Contest and publish the first-place story. *TMF* will also recognize units which have won their place on the magazine's Roll of Honor by flying an exceptional number of accident-free years and/or hours. Unfortunately some deserving flying units will miss out again this year because they did not nominate themselves for a flying-hour award. Safe flying-hour milestone awards are not presented automatically because complete unit flying time breakdowns are not available to the *Flyer*. We depend on units to track their own time and nominate themselves. Check MACR 900-3, paragraph 7, for details and don't get left out.

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Sergeant Cranston, I think maybe we need to take another look at the weight and balance data.